

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

What is claimed is:

1. (currently amended) Software definable pre-amplifier apparatus comprising:

- (a) one or a plurality of reconfigurable circuit means which are configured in real time under control of configuration data allowing said reconfigurable circuit means to implement, in hardware, different signal processing functions required for at least one of different digital signal processing algorithms and different audio processing protocols, the reconfigurable circuit means being reconfigured at a rate that ensures that data input from at least one of a plurality of input channels and output from at least one of a plurality of output channels is processed in accordance with the required sampling rate or sampled data rate in a way that does not cause any signal aliasing and minimizes noise artifacts on any of the operative input and output channels in relation to the selected signal processing functions to be performed;
- (b) a local memory coupled to said reconfigurable circuit means, said local memory storing the configuration data and



being operative to supply configuration data to said reconfigurable circuit means when a different signal processing function is to be performed; and

(c) a host processor and associated program memory means for updating configuration data in said local memory and controlling and monitoring operation of the apparatus.

2. (previously presented) Software definable pre-amplifier apparatus as claimed in claim 1, further comprising integrated hard disk drive memory means or non-volatile semiconductor memory means or volatile semiconductor memory means for storing and retrieving digitized audio data signals.

3. (previously presented) Software definable pre-amplifier apparatus as claimed in Claim 1, further comprising mezzanine or card modules interfaced to said apparatus to allow the apparatus to be expanded or upgraded for use with other protocols or for adding more audio output channels and or accommodating more source channel interfaces, said mezzanine or card modules containing any combination of the following circuitry:

- 1) Digital Signal Processors,
- 2) Memory,
- 3) Programmable Logic Devices (PLDs)
- 4) Interface logic,



- 5) Analogues to Digital Converter (ADC),
- 6) Digital to Analogues Converter (DAC),
- 7) Small signal amplification and filter circuitry.

4. (previously presented) Software definable pre-amplifier apparatus as claimed in Claim 1, further comprising modem means, allowing Internet access so the user can download upgrade firmware or software for implementing new audio protocols or configuring said circuit mean to implement new algorithms and or hardware configurations, the new firmware and software being stored in non-volatile memory under the control of the host processor, the Internet access also allowing the user to download audio information, which is then processed and stored by the apparatus.

5. (previously presented) Apparatus as claimed in Claim 1, further comprising facilities to allow removable memory means containing non-volatile memory to be inserted into the apparatus and removed from the apparatus, previously stored data being read from the removable memory means and processed by the apparatus, or processed music data or digitized audio signals, formatted in a selected format, being stored in the non-volatile memory, allowing the user to play the recorded



data on another apparatus which has the facilities to access the data stored on the removable memory means.

6. (previously presented) Apparatus as claimed in Claim 1, wherein said circuit means comprise software or firmware definable logic blocks that are full custom VLSI devices or Application Specific Integrated Circuits (ASICs) which implement any combination of programmable logic, fixed standard cell logic, mixed signal circuitry and processor cores.

7. (previously presented) Apparatus as claimed in Claim 1, further comprising input circuitry or output circuitry based on reconfigurable circuit means, allowing interfaces to be reconfigured to implement a desired interface protocol or format.

8. (previously presented) Apparatus as claimed in Claim 1, wherein the apparatus is configured for simultaneous use by more than one user where signal data from one or more signal sources is processed and output to separate peripheral units.



9. (previously presented) Apparatus as claimed in Claim 1, wherein an external modem means is employed to access the Internet.

10. (previously presented) Apparatus as claimed in Claim 1, wherein feedback signals are provided from remote microphone means to allow the signal processor devices to adapt in real time the sound of played music to desired acoustical settings.

11. (previously presented) Apparatus as claimed in Claim 1, further comprising analogue to digital converter (ADC) means to allow analogue input signals to be first converted to digital signals and processed in the digital domain, the sampling frequency of the analogue to digital converter means (ADCs) being sufficient to accurately represent the signal in the digital domain.

12. (previously presented) Apparatus as claimed in Claim 1, wherein input signals to the apparatus from source means or output signals from the apparatus to signal sink means is by wireless communication means.

13. (previously presented) Apparatus as claimed in claim 12, wherein transfer of data to and from the pre-amplifier



apparatus is according to Bluetooth, HomeRF, IEEE 802.11, DECT or Wireless ATM protocol.

14. (previously presented) Apparatus as claimed in Claim 3 wherein the mezzanine or card modules have interface means based on reconfigurable circuit means, so that upgrades are easily implemented by changing the interface means of the associated mezzanine or card module.

15. (previously presented) Apparatus as claimed in Claim 1, wherein said circuit means comprise logic blocks programmed and or configured to implement reverberation and echo effects.

16. (previously presented) Apparatus as claimed in Claim 1, wherein said circuit means comprise logic blocks programmed and configured to emulate the acoustic characteristics of a valve amplifier and alter the output signals so they sound as if they were produced by a valve amplifier.

17. (previously presented) Apparatus as claimed in Claim 1, wherein a personal computer (PC) is connected to allow control of the apparatus, reconfigure the apparatus, diagnose the apparatus or download or upload music data, which are processed or stored in internal memory for future use.



18. (previously presented) Apparatus as claimed in claim 1, wherein remote control means is used to control peripheral signal source apparatus via the pre-amplifier apparatus.

19. (previously presented) Apparatus as claimed in Claim 1, wherein digital switching means are employed to route and transfer data from the apparatus.

20. (previously presented) Apparatus as claimed in claim 19, wherein the digital switching means takes the form of a cross bar switch or a self-routing switch in which data packets or cells have an appended routing tag to control the flow of the packets or cells through the switch to their destination.

21. (previously presented) Apparatus as claimed in claim 20, wherein the digital switching means uses priority output queues to allow data with different priorities to be queued in separate queues to reduce congestion and head of line blocking.

22. (previously presented) Apparatus as claimed in Claim 19, wherein digital data for transfer via switching means is



encapsulated as a variable length data packet or same length cell.

23. (previously presented) Apparatus as claimed in Claim 1, further comprising an integrated read/writable compact disc transport and associated control circuitry to allow stored digitized audio data to be read or written to compact disc media.

24. (previously presented) Apparatus as claimed in Claim 1, further comprising an integrated read/writable Digital Versatile Disc transport and associated control circuitry to allow stored digitized audio data to be read or written to Digital Versatile Disc media.

25. (previously presented) Apparatus as claimed in Claim 1, wherein peripheral units are situated remotely from the pre-amplifier apparatus in which control and data messages are transferred by wireless means allowing movement of the said remote peripheral units to different locations.

26. (previously presented) Apparatus as claimed in Claim 3, wherein the mezzanine or card modules incorporate "Plug and Play" means to allow a mezzanine or card module to configure



and initialize itself and interact with the host processor to indicate the configuration, status and functionality of the mezzanine or card modules.

27. (previously presented) Apparatus as claimed in Claim 3, wherein the mezzanine or card modules incorporate means to be hot swappable, allowing card module insertion or removal from a card frame of the apparatus while the apparatus is operational.

28. (previously presented) Apparatus as claimed in Claim 1, wherein some of the reconfigurable circuit means are configured to implement functions and algorithms normally performed in peripheral equipment, allowing new peripheral equipment which operates with said modular and software definable pre-amplifier apparatus to have reduced functionality.

29. (previously presented) Apparatus as claimed in Claim 1, wherein the apparatus is programmed to record data using "non-volatile" memory means at a predefined time from a peripheral device.

30. (canceled)



31. (previously presented) Apparatus as claimed in claim 1, wherein said circuit means include digital signal processor devices and associated memory devices, the configuration and allocation of the software programs used by each digital signal processor device being performed in real time by the host processor or configuration routines stored in non-volatile memory associated with the digital signal processor devices, the allocation of the specific software program being determined by user inputs.

32. (previously presented) The apparatus of claim 1, wherein said apparatus is modular.